
DEPARTMENT OF THE ARMY 02383.TD
U.S. ARMY CORPS OF ENGINEERS JAN 97

TULSA DISTRICT GUIDE SPECIFICATION

SECTION 02383

DRILLED FOUNDATION PIERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 615	(1995b) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 616	(1995b) Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 617	(1995b) Axle-Steel Deformed and Plain Bars for Concrete Reinforcement

1.2 CONTRACTOR QUALIFICATIONS

The work shall be performed by a Contractor specializing in the specified foundation system and having experience installing the specified foundation system under similar subsurface conditions and shall furnish evidence that he has been engaged in the successful installation of drilled foundation piers for at least 4 years.

1.3 SUBSURFACE DATA

Subsurface data logs are shown on the drawings. The subsurface investigation report is available for examination at the Tulsa District Office, Corps of Engineers.

1.4 SURVEYS

Lines and levels shall be established and pier centerline locations staked and maintained by a registered surveyor or engineer provided by the Contractor.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-04 Drawings

Reinforcing Steel; [____].

Shop drawings shall be submitted for reinforcing steel.

SD-13 Certifications

Contractor Qualifications; [____] Survey Notes; [____].

Copies of certified survey notes and certification of Contractor Qualifications shall be submitted to the Contracting Officer.

SD-18 Records

Drilled Foundation Piers; [____].

The Contractor shall furnish records for each pier, showing shaft and bell diameters, depths of test holes, top and bottom elevations, bearing strata description, casing description, water conditions, concrete strength, concrete volume rock elevations, dates of excavation and concrete placement, and other pertinent information. Records shall be submitted on forms as provided in SECTION: CONTRACTOR QUALITY CONTROL SYSTEM. Upon completion of work, the Contractor shall provide a record of centerline locations based on the survey of the registered surveyor or engineer provided by the Contractor. In addition, corrective measures and construction changes shall be similarly recorded. All records shall be delivered to the Contracting Officer.

1.6 TOLERANCES

- a. Cross sections of shafts and bells shall not be less than dimensions indicated.
- b. The maximum allowable deviation for pier top location shall be 75 mm 3 inches from centerline locations.
- c. The maximum allowable deviation of pier plumbness shall be 38 mm 1-1/2 inches for the top 3 m and 7 mm in 3 m 1/2 inch in 10 feet for the remaining depth.
- d. The maximum allowable inclination deviation for batter piers shall be 5 percent of length from specified inclination.
- e. The top of concrete placed shall be plus or minus 75 mm 3 inches from the elevation shown.

1.7 SAFETY REQUIREMENTS

1.7.1 Life Line

Each person entering a drilled pier excavation shall be provided with a life line rigged so that the person can be immediately hoisted out of the excavation in an emergency. The life line shall be suitable for instant rescue, securely fastened to a shoulder harness, and separated from any line used to remove excavated materials. No person shall be lowered into a drilled pier excavation prior to casing the shaft through the overburden.

1.7.2 Ventilation

Drilled pier excavations shall be provided with a ventilating device of sufficient capacity to assure a safe atmosphere before workmen and inspectors are permitted to enter the excavation.

1.8 MEASUREMENT AND PAYMENT

Drilled foundation piers shall be measured by the linear meter foot for depths actually drilled in conformance to the specification requirements. The length of drilled piers shall be measured from the authorized bottom of the bells up to the bottom of the grade beam, slab, or pier cap, or up to the bottom of any formed portion of the pier above grade, as applicable. Payment for drilled foundation piers will be made at the applicable contract unit price per linear meter foot for the respective diameter pier listed in the BIDDING SCHEDULE. This payment shall constitute full compensation for all plant, labor, materials, and all costs necessary for drilling, casing, and furnishing and placing steel and concrete, complete, except bellling of piers. Costs of labor and materials associated with bellling piers shall not be included in the linear meter foot price, but shall be included in the applicable structure listed in the BIDDING SCHEDULE to which the bellling pertains.

PART 2 - PRODUCTS

2.1 CONCRETE

Concrete shall conform to the requirements of Section 03300 CONCRETE FOR BUILDING CONSTRUCTION, as modified herein. Concrete strength shall be 25 Mpa 3,000 psi at 28 days. Slump shall be from 125 to 175 mm 5 to 7 inches.

2.2 COARSE AGGREGATE

Maximum size of coarse aggregate shall be 19 mm 3/4-inch.

2.3 REINFORCING STEEL

Reinforcing steel shall conform to ASTM A 615, ASTM A 616, or ASTM A 617, Grade 420 60. Steel shall be tied into cages and inserted securely in the piers in the position and alignment as shown prior to concrete placement.

PART 3 - EXECUTION

3.1 EQUIPMENT

Pier drilling equipment shall have sufficient torque capacity and downward force capacity for the site conditions.

3.2 INSTALLATION

3.2.1 Excavation

Pier shafts and bells shall be excavated to depths, dimensions, and shapes shown. Bottoms of bells or shafts shall be cleaned of loose or soft material and leveled. Excavated material shall be disposed of in accordance with Section 02221 EXCAVATION, FILLING, AND BACKFILLING FOR BUILDINGS.

3.2.2 Temporary Casing

In drilling piers, the surrounding soil and the earth walls shall be protected against cave-ins, displacement of the surrounding earth, and retention of ground water by means of temporary steel casings. Casings shall have outside diameters not less than indicated shaft sizes and shall be a minimum of 7 mm 1/4 inch thick. Temporary steel casings shall be withdrawn as the concrete is being placed, maintaining sufficient head of concrete within the casing to prevent reduction in the diameter of the drilled shaft due to earth or hydrostatic pressure on the fresh concrete and to prevent extraneous material from falling in from the sides and mixing with concrete. Casings may be jerked upward a maximum of 100 mm 4 inches to break the bottom seal but thereafter removal shall be with a smooth, continuous motion. The inside of steel casings shall be thoroughly cleaned and oiled before reuse. A temporary casing shall be placed from the pier top to the ground surface until the concrete has set if the elevation of the top of the pier is below the ground surface.

3.2.3 Placement

3.2.3.1 General

Concrete shall be continuously placed within 3 hours after the completion of excavation. Concrete shall be placed by methods that insure against segregation and dislodging of excavation sidewalls and shall completely fill the shaft. Concrete shall be placed by pumping or drop chutes. Concrete shall be brought to a true level surface inside the shaft and a full width cross key formed or dowels installed should it become necessary to interrupt placing concrete in any pier. Prior to placing additional concrete, joint surfaces shall be cleaned of laitance and shall be slush grouted using one-to-one portland cement/sand mixture. Concrete shall be vibrated for the upper 1500 mm 5 feet of the pier. Water that flows into the excavations shall be continuously removed and all water shall be removed from the excavation bottom, to the extent possible, prior to concrete placement. The maximum permissible depth of water will be 50 mm 2 inches at the beginning of the concrete placement.

3.2.3.2 Underwater Placement

In the event of a water condition that makes it impossible or impractical to dewater the excavation, concrete shall be placed under water by pumping after water movement has stabilized. The pump pipe for depositing concrete in the drilled shaft shall have a minimum inside diameter of 100 mm 4 inches and shall be watertight. The discharge end of the pump pipe shall be constructed so that it is watertight against intrusion from outside and so that it will readily discharge concrete. The pump pipe shall be kept full of concrete until work is completed.

3.3 PROTECTION

Protection shall be provided around top of all excavations to prevent debris from being dislodged into the excavation and concrete.

3.4 QUALITY CONTROL

3.4.1 Contractor Supervision

The Contractor shall provide for the supervision of all phases of drilled pier construction. Each drilled pier excavation shall be checked by the

Contractor for its depth, water removal, cleanup, workmanship, and for all tolerance requirements before any concrete is placed.

3.4.2 Government Inspection

The Contracting Officer will inspect each drilled pier excavation. Concrete shall not be placed until the excavation has been approved by the Contracting Officer. The Contractor shall furnish the Contracting Officer all necessary equipment and support personnel required for proper inspection of drilled pier excavations.

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